

Technical Notes



Technical Notes for Vital Statistics

A. SOURCES OF DATA

Vital Events

Birth and death certificates, reports of fetal deaths, and induced abortion reports were the source documents for data on vital events of South Dakota during the 2003 calendar year. Marriage and divorce data were compiled from transcripts that were received from each county.

The cut-off date for 2003 data in this report was May 31, 2004. Any data pertaining to a 2003 event for which a certificate was filed after May 31, 2003, were not included in this report. Because the number of records received after that date is so small, in most instances, it is of little significance for the purpose of analysis.

Events relating to South Dakota residents that occurred in another state were included in this report. The inclusion of these data is made possible by an agreement among all registration areas in the United States for resident exchange of copies of certificates.

Birth and fetal death records are the responsibility of the person in attendance; however, the records are usually completed by medical records personnel who are not necessarily present at the delivery. Death records are the responsibility of the funeral director. The medical certification of the cause of death is completed by a physician or coroner.

United States data were obtained from publications produced by the Department of Health and Human Services, Public

Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, Hyattsville, Maryland.

Populations/Rates

The populations used to develop the South Dakota rates presented are as follows. The rates from 2000 through 2003 are based on the 2000 South Dakota census data. The rates from 1990 through 1999 are based on the 1990 South Dakota census data. The rates for the remainder of the years are based on South Dakota population estimates for the current year or the next previous year depending on the availability of the population estimates at the time of publishing. The rates for 1980 are based on the corresponding South Dakota census data.

The standard error (SE) of a rate is used in health statistics when studying or comparing rates. The SE defines a rate's variability and can be used to calculate a confidence interval (CI) to determine the actual variance of a rate 95 percent of the time. Rates for two different populations are considered to be significantly different when their confidence intervals do not overlap.

The standard error and confidence intervals are calculated in the following manner. For example, County A's low birth weight rate is 5.3 percent. This was based on 122 low birth weight births from 1999 through 2003. The square root of 122 is roughly 11.0. By dividing the rate of 5.3 by 11.0, the estimated SE of approximately 0.48 is the result. The estimated SE can then be used to compute a 95 percent CI for the rate. The

standard formula for determining the 95 percent CI of a rate is:

$$\text{RATE} \pm (1.96 * \text{SE})$$

Following this formula, we produce an equation of $5.3 \pm (1.96 * 0.48)$ and the result is 5.3 ± 0.9 . From this the estimated 95 percent CI is from 4.4 to 6.2 percent. It could then be stated, with 95 percent certainty, that the actual 1999-2003 low birth weight rate for County A is between 4.4 and 6.2 percent.

Therefore, County A's low birth weight rate would not be considered significantly different from the state rate. This is because the confidence intervals for County A (4.4-6.2) and the state (5.2-5.6) overlap. Conversely, County B's low birth weight rate is considered significantly different from the state rate because their respective confidence intervals (5.8-6.9) and (5.2-5.6) do not overlap.

All national rates for the United States were taken from the publications produced by the Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, Hyattsville, Maryland.

B. DATA LIMITATIONS

Quality

The quality of data presented in this report is directly related to the completeness and accuracy of the information contained on the certificates.

Medical Certification

Causes of death on death certificates are

coded according to the tenth revision of the *International Classification of Disease* (ICD-10). This classification as adopted by the World Health Organization in 1999 is used throughout the world for selecting the underlying cause of death and classifying the cause.

Race

The race reported on the vital records reflects the opinion of the informant and does not follow any prescribed rules for the reporting of race. This report shows tabulations for white, American Indian, and other. Persons classified as other are few in South Dakota and tabulations reflecting these events are not statistically significant.

Birth data were tabulated using the race of the mother. No attempt is made to determine the race of the child from the race shown for the father and the mother.

Beginning in 2003, the South Dakota Department of Health began collecting multiple race data on the birth certificate for the mother and the father. While this detail is valuable, it does not lend itself to consistency with regard to previous years of race data. Therefore, in order to calculate comparable race data, we allocated the multiple race responses into one race. We did this using the following five steps. As soon as one of these conditions was met the process stopped.

1. Any multiple race category that contained American Indian was assigned to American Indian.
2. Any multiple race category that contained Black was assigned to Black.

3. Any multiple race category that contained Asian was assigned to Asian.
4. Any multiple race category that contained Hawaiian was assigned to Hawaiian.
5. Any multiple race category that contained races other than first four listed was assigned to "Other Races".

Therefore, after using this allocation process, the only persons that were allocated as white were those that had only white listed as their race.

Health Status Indicators

All rates are subject to variation, and this variation is inversely related to the number of events used to calculate the rate. The smaller the number of events, the higher the variability. Rates based on a small number of events over a specified time period or for small populations vary considerably and should be viewed with caution. South Dakota contains many counties with sparse or small populations. Therefore, when calculating health status indicators for these sparsely populated counties, there will always be the possibility that the rate is just a chance variation. For instance, in a five-year period a county with a small population could have annual infant mortality rates of 0, 0, 0, 0, and 25. While rates for 4 of the years are 0, the fourth year rate of 25 approaches that of third-world countries and, taken alone, is probably not a true indicator of the county's health status.

To attempt to minimize chance variation we use five-year averages. Thus, in the example above the infant mortality rate would have been approximately five for the five-year period, which is probably a more accurate depiction of the county's

health status. Despite these precautions, the most sparsely populated counties using five-year averages will still not reduce chance variation significantly for some of the indicators due to the small number of events.

Health Care Resources

Full-time equivalents (FTE) for primary care physicians and mid-level health care providers (physician assistants, nurse practitioners, and certified nurse midwives) were determined by the Office of Rural Health Providers Survey. The original survey was conducted during the spring and early summer of 1996 and the data have been updated as necessary since that time.

C. GEOGRAPHIC ALLOCATION

In South Dakota, registration of vital events is classified geographically in two ways. The first way is by place of occurrence, i.e., the actual state and county in which the birth or death took place. The second, and more customary way is by place of residence, i.e., the state or county stated to be the usual residence of the decedent in the case of deaths or of the mother in the case of a newborn.

Fetal deaths and infant deaths, in cases where the child was never discharged from the hospital, are classified to the residence of the mother.

Occurrence statistics have administrative value and statistical significance, especially when calculating accident statistics. Residence statistics are useful in determining health indices for planning and evaluation purposes. The statistics provided in this report are residence data unless otherwise stated.

Allocation of vital events by place of residence is sometimes difficult, because classification depends entirely on the statement of the usual place of residence furnished by the informant at the time the original certificate is completed. For various reasons, this statement may be incorrect or incomplete. For example, mailing addresses very often differ from the actual geographic residence.

D. DEFINITIONS

Age-Adjusted Death Rate (Direct Method) - Age-specific death rates for a selected population are applied to a standard population in order to calculate what rate would be expected if the selected population had the same age distribution as the standard. The total of expected deaths divided by the total of the standard population and multiplied 100,000 yields the age-adjusted death rate per 100,000. (It is important to use the same standard population in the computation of each age-adjusted rate to achieve comparability. Age-adjusted death rates should never be compared with any other types of death rate or be used as absolute measurements of mortality.)

Age-Adjusted Death Rate - Absolute counts of deaths or crude death rates do not readily lend themselves to analysis and comparison between years and various geographic areas. For example, the older a population, the more people die. Statistically, South Dakota has a high percentage of elderly, therefore, if crude rates of death, based on population, in South Dakota were compared with those of the United States, it would appear that South Dakota had a high rate of mortality. The comparison would be misleading.

Consequently, a mortality rate which has been adjusted for age has been devised to allow more refined measurement with which to compare deaths over geographic areas or time periods. This is referred to as an age-adjusted death rate.

Age-Specific Birth Rate - Number of live births to women in a specific age group per 1,000 female population in that age group.

Age-Specific Death Rate - Number of deaths in a specific age group per 100,000 population in that age group.

Birth Weight - The first weight of the fetus or newborn obtained after birth. This weight should be measured, preferably, within the first hour of delivery before significant postnatal weight loss has occurred. Low birth weight babies are those born alive who weigh less than 2,500 grams (about 5 pounds 9 ounces).

Cause Specific Death Rate - The number of resident deaths due to a specific cause divided by the total resident population X 100,000.

Cancer - Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues.

Crude Birth Rate - The number of resident live births divided by the total resident population X 1,000.

Crude Death Rate - The number of resident deaths divided by the total resident population X 100,000.

Federally Qualified Health Centers -

Provide comprehensive primary care to anyone, regardless of ability to pay. Those whose income is twice the poverty level and are not insured, either privately or through government programs, receive care on a sliding fee scale.

Fetal Death - Death prior to the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy. The death is indicated by the fact that after such expulsion or extraction, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. (South Dakota requires the reporting of any fetus weighing over 500 grams).

Fetal Death Rate - The number of fetal deaths divided by the total number of live births and fetal deaths X 1,000.

Health Alliance Counties - Community health services in participating counties are delivered through a partnership involving local county governments, local health care providers and the South Dakota Department of Health. Instead of the Department of Health delivering community health services, the department contracts with private health care providers to deliver the same services. The goal is to support local health care systems while making the most efficient use of the department resources. Each Alliance contract also forms a Community Health Council to advise local health care providers on community health services.

Induced Abortion - The use of any means to intentionally terminate the pregnancy of a female known to be pregnant with knowledge that the termination with those means will, with reasonable likelihood, cause the death of the fetus.

Infant Death - Death of a live born infant less than one year (365 days) of age. Infant deaths equal the sum of neonatal plus postneonatal deaths.

Infant Mortality Rate - The number of infant deaths divided by the total number of live births X 1,000.

Live Birth - The complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.

Low Birth Weight - A birth weight under 2,500 grams or 5 pounds, 9 ounces.

Mean - The arithmetic average of a set of values or the sum of all the values divided by the number of values in the group.

Median - The value or number that divides a population into two equal halves. The value that falls exactly in the middle of the entire range of values ranked in order from low to high such that 50 percent of the values fall above it and 50 percent fall below it. If the

number of values is even, a value halfway between the two values nearest the middle is used.

Mode - The most frequently occurring value in a distribution.

Neonatal Mortality Rate - (Neonatal Death = Death occurring to infants from birth through 27 days old). The number of neonatal deaths divided by the total number of live births X 1,000.

Neonatal Period – The period of infancy from the first through the 27th day of life.

Place of Occurrence and Residence – In South Dakota, registration of vital events is classified geographically in two ways. The first way is by place of occurrence, i.e., the actual county in which the event took place. The second, and more customary way, is by place of residence, i.e., the county stated to be the usual residence of the decedent in the case of deaths or of the mother in the case of a newborn. Births and deaths relating to South Dakota residents which occurred in another state are included in this report. The inclusion of these data are made possible by an agreement among all registration areas in the United States for resident exchange of copies of certificates.

Population Under 100% of Poverty – Those people living under the poverty level as defined by the federal government. In 2003, the poverty level for a family of four was \$18,810. Because poverty levels are not computed for all persons living in a given geographical area (e.g. those confined to a correctional institution),

the percent of the population under 100 percent of poverty was not computed by dividing the number below poverty by the total population. Instead, the denominator was the total population for which poverty status was determined.

Population Under 200% of Poverty – Those people living under two times the poverty level as defined by the federal government. Because poverty levels are not computed for all persons living in a given geographical area (e.g. those confined to a correctional institution), the percent of the population under 200 percent of poverty was not computed by dividing the number below poverty by the total population. Instead, the denominator was the total population for which poverty status was determined.

Postneonatal Mortality Rate - (Postneonatal Death = Death occurring to infants 28 days to 1 year of age). The number of postneonatal deaths divided by the total number of live births X 1,000.

Postneonatal Period – The period of infancy from 28 days to less than one year old.

Primary Care – Primary care physicians are those specializing in family practice, general internal medicine, general pediatrics, and obstetrics/gynecology, as well as general practitioners. Primary care mid-level practitioners are those mid-level health care providers supervised by a primary care physician.

Rural Health Clinics – Receive increased Medicare and Medicaid reimbursement to help ensure the provision of primary care services to rural and underserved areas.

Significance – Most of the health status indicators in South Dakota's counties are not significantly different from the state's averages. This means that although a county's calculated rate may be higher or lower than the state average, the small number of events in the county makes the rate vary considerably from year to year. For example, if in 1999, County A had 100 babies born and none died, the infant mortality rate would be 0.0. But if in 2000, County A had another 100 babies born and one died, the infant mortality rate would be 10.0.

When there is a small number of events and the probability of such an event is small, a mathematical formula is used to calculate whether or not the difference in rates is statistically significant or due more to chance.

Years of Potential Life Lost before Age 75 - Based only on deaths before the age of 75. For example, if someone dies at 35 years of age, that is calculated as 40 years of potential life lost. Conversely, if someone dies at 75 years or older, that is calculated as zero years of potential life lost.

Age-Adjusted Years of Potential Life Lost (YPLL) - Age-adjusted rates for years of potential life lost (YPLL) before age 75 years use the year 2000 standard population and are based on eight age groups (< 1 year, 1-4, 5-14, and 10-year age groups through 65-74 years).

E. DEFINITIONS OF MEDICAL TERMS - The following definitions are for maternal and infant items reported in checkbox format on the South Dakota Certificate of Live Birth.

These items are also listed on the 1989 revision of the U.S. Standard Certificate of Live Birth. The definitions presented were adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials for the Association for Vital Records and Health Statistics (1).

CONGENITAL ANOMALIES:

Anencephalus - Absence of the cerebral hemispheres.

Spina Bifida/Meningocele - Developmental anomaly characterized by defective closure of the bony encasement of the spinal cord, through which the cord and meninges may or may not protrude.

Hydrocephalus - Excessive accumulation of cerebrospinal fluid within the ventricles of the brain with consequent enlargement of the cranium.

Microcephalus - A significantly small head.

Other Central Nervous System Anomalies - Other specified anomalies of the brain, spinal cord, and nervous system.

Heart Malformations - Congenital anomalies of the heart.

Other Circulatory / Respiratory Anomalies - Other specified anomalies of the circulatory and respiratory systems.

Rectal Astresia/Stenosis - Congenital absence, closure, or narrowing of the rectum.

Tracheo - Esophageal Fistula / Esophageal Aresia - An abnormal passage between the trachea and the esophagus; esophageal atresia is the congenital absence or closure of the esophagus.

Omphalocele / Gastroschisis - An omphalocele is a protrusion of variable amounts of abdominal viscera from a midline defect at the base of the umbilicus. In gastroschisis, the abdominal viscera protrude through an abdominal wall defect, usually on the right side of the umbilical cord insertion.

Other Gastrointestinal Anomalies - Other specified congenital anomalies of the gastrointestinal system.

Malformed Genitalia - Congenital anomalies of the reproductive organs.

Renal Agenesis - One or both kidneys are completely absent.

Other Urogenital Anomalies - Other specified congenital anomalies of the organs concerned in the production and excretion of urine, together with organs of reproduction.

Cleft Lip/Palate - Cleft lip is a fissure or elongated opening of the lip; cleft palate is a fissure in the roof of the mouth. These are failures of embryonic development.

Polydactyly / Syndactyly / Adactyly - Polydactyly is the presence of more than five digits on either hands and/or feet; syndactyly is having fused or webbed fingers and/or toes; adactyly is the absence of fingers and/or toes.

Club Foot - Deformities of the foot, which is twisted out of shape or position.

Diaphragmatic Hernia - Herniation of the abdominal contents through the diaphragm into the thoracic cavity usually resulting in respiratory distress.

Other Musculoskeletal / Integumental Anomalies - Other specified congenital anomalies of the muscles, skeleton, or skin.

Down's Syndrome - The most common chromosomal defect with most cases resulting from an extra chromosome (trisomy 21).

Other Chromosomal Anomalies - All other chromosomal aberrations.

MEDICAL HISTORY FACTORS FOR THIS PREGNANCY:

Anemia - Hemoglobin level of less than 10.0 g/dL during pregnancy or a hematocrit of less than 30 during pregnancy.

Cardiac Disease - Disease of the heart.

Acute or Chronic Lung Disease - Disease of the lungs during pregnancy.

Diabetes - Metabolic disorder characterized by excessive discharge of urine and persistent thirst; includes juvenile onset, adult onset, and gestational diabetes during pregnancy.

Genital Herpes - Infection of the skin of the genital area by herpes simplex virus.

Previous Preterm Or Small-For-Gestational-Age Infant - Previous birth of an infant prior to term (before 37 completed weeks of gestation) or of an infant weighing less than the tenth percentile for gestational age using a standard weight-for-age chart.

Renal Disease - Kidney disease.

Blood Group Sensitization - The process or state of becoming sensitized to the Rh factor as when an Rh-negative woman is pregnant with an Rh-positive fetus.

Uterine Bleeding - Any clinically significant bleeding during the pregnancy taking into consideration the stage of pregnancy; any second or third trimester bleeding of the uterus prior to the onset of labor.

COMPLICATIONS OF LABOR AND/OR DELIVERY:

Febrile - A fever greater than 100 degrees F. or 38 C. occurring during labor and/or delivery.

Meconium, Moderate/Heavy - Meconium consists of undigested debris from swallowed amniotic fluid, various products of secretion, excretion, and shedding by the gastrointestinal tract; moderate to heavy amounts of meconium in the amniotic fluid noted during labor and/or delivery.

Premature Rupture of Membranes (more than 12 hours) - Rupture of the membranes at any time during pregnancy and more than 12 hours before the onset of labor.

Abruptio Placenta - Premature separation of a normally implanted placenta from the uterus.

Placenta Previa - Implantation of the placenta over or near the internal opening of the cervix.

Other Excessive Bleeding - The loss of a significant amount of blood from conditions other than abruptio placenta or placenta previa.

Seizures During Labor - Maternal seizures occurring during labor from any cause.

Precipitous Labor (less than 3 hours) - Extremely rapid labor and delivery lasting less than 3 hours.

Prolonged Labor (more than 20 hours) - Abnormally slow progress of labor lasting more than 20 hours.

Dysfunctional Labor - Failure to progress in a normal pattern of labor.

Breech/Malpresentation - At birth, the presentation of the fetal buttocks rather than the head, or other malpresentation.

Cephalopelvic Disproportion - The relationship of the size, presentation, and position of the fetal head to the maternal pelvis which prevents dilation of the cervix and/or descent of the fetal head.

Cord Prolapse - Premature expulsion of the umbilical cord in labor before the fetus is delivered.

Anesthetic Complications - Any complications during labor and/or delivery brought on by an anesthetic agent or agents.

Fetal Distress - Signs indicating fetal hypoxia (deficiency in amount of oxygen reaching fetal tissues).

OBSTETRIC PROCEDURES:

Amniocentesis - Surgical transabdominal perforation of the uterus to obtain amniotic fluid to be used in the detection of genetic disorders, fetal abnormalities, and fetal lung maturity.

Electronic Fetal Monitoring - Monitoring with external devices applied to the maternal abdomen or with internal devices with an electrode attached to the fetal scalp and a catheter through the cervix into the uterus, to detect and record fetal heart tones and uterine contractions.

Induction of Labor - The initiation of uterine contractions before the spontaneous onset of labor by medical and/or surgical means for the purpose of delivery.

Stimulation of Labor - Augmentation of previously established labor by use of oxytocin.

Tocolysis - Use of medication to inhibit preterm uterine contractions to extend the length of pregnancy and, therefore, avoid a preterm birth.

Ultrasound - Visualization of the fetus and the placenta by means of sound waves.

ABNORMAL CONDITIONS OF THE NEWBORN:

Anemia - Hemoglobin level of less than 13.0 g/dL or a hematocrit of less than 39 percent.

Birth Injury - Impairment of the infant's body function or structure due to adverse influences which occurred at birth.

Hyaline Membrane Disease/RDS - A disorder primarily of prematurity, manifested clinically by respiratory distress and pathologically by pulmonary hyaline membranes and incomplete expansion of the lungs at birth.

Meconium Aspiration Syndrome - Aspiration of meconium by the fetus or newborn affecting the lower respiratory system.

Assisted Ventilation (less than 30 minutes) - A mechanical method of assisting respiration for newborns with respiratory failure.

Assisted Ventilation (30 minutes or more) - Newborn placed on assisted ventilation for 30 minutes or longer.

Seizures - A seizure of any etiology.